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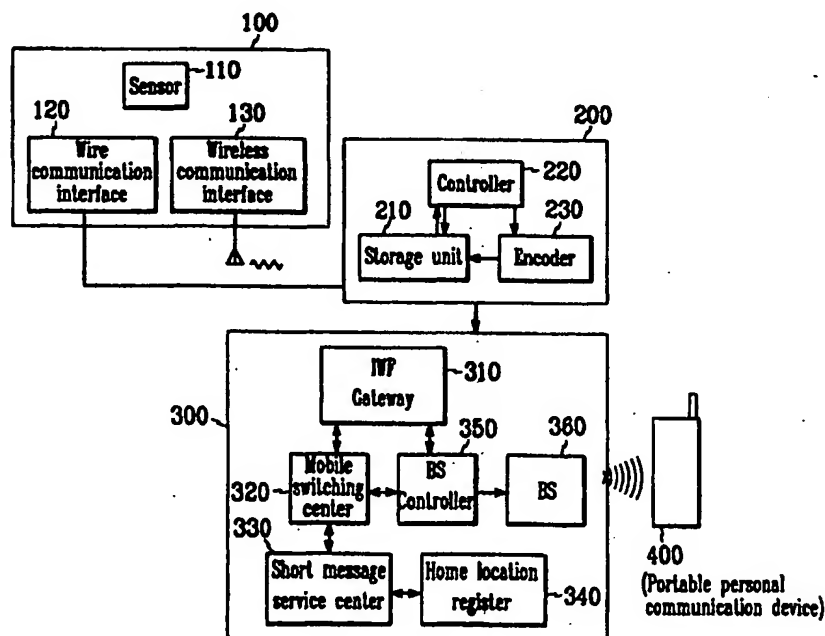
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(54) Title: SECURITY SYSTEM AND METHOD USING MOBILE COMMUNICATION NETWORK



(57) Abstract: Disclosed is a security system using a mobile communication network that includes a camera for picking up an image of a designated area, a server connected to the camera and the network for converting the image received from the camera to a proper format and storing the converted image, and a portable personal communication device for operating a built-in web browser to access the server and downloading video signals from the server to check the image of the designated area; and a security method using a mobile communication network in which a camera picks up an image of a designated area to check security of the designated area.

WO 01/26280 A1



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## Security System and Method Using Mobile Communication Network

### BACKGROUND OF THE INVENTION

#### 5 (a) Field of the Invention

The present invention relates to a security system and method, and more particularly, to a security system and method whereby the user can check security of a designated area using a mobile communication network.

#### (b) Description of the Related Art

10 Recently, the use of security systems covering from conventionally restricted areas such as banks or plants to apartments, individual homes, etc. has been increasing.

The conventional security systems use a wire or wireless camera provided at a designated area, for example, inside or outside a building, or in  
15 a parking lot to monitor security of the area and check for emergencies from the images picked up by the camera.

However, such conventional security systems have a disadvantage in that the user cannot monitor security of a designated area while he/she is moving to another area.

### 20 SUMMARY OF THE INVENTION

It is an object of the present invention to solve the problem and to provide a security system and method whereby a user can monitor security of a designated area with a mobile communication device even when he/she is moving to another area.

In one aspect of the present invention, there is provided a security system using a mobile communication network according to the present invention that includes: a camera for picking up an image of a designated area; a server connected to the camera and the network for converting the image received from the camera to a proper format and storing the converted image; and a portable personal communication device for operating a built-in web browser to access the server and downloading video signals from the server to check the image of the designated area.

The portable personal communication device operates the built-in web browser to access the server and receives the image of the designated area in real time.

Preferably, the security system further includes a mobile communication network for allowing the portable personal communication device to access the server and establishing a transmission path of the video signals.

Preferably, upon detection of an emergency at the designated area, the server sends a short message over the mobile communication network to inform of the emergency at the designated area.

Preferably, upon detection of the emergency at the designated area from the received text message, the portable personal communication device gives an access to the server to download the stored video signals generated during the emergency from the server and check security of the designated area.

Preferably, the server converts the image received from the camera in a format including moving picture expert group (MPEG), joint photographic expert group (JPEG), wavelet, or Internet streaming. The server supports the streaming data format using the Internet streaming technique for the user to  
5 download audio signals and motion pictures over the Internet.

Preferably, the portable personal communication device is a personal digital assistant (PDA), ~~cellular phone, or an IMT-2000 terminal.~~

In another aspect of the present invention, there is provided a security method using a mobile communication network in which a camera  
10 picks up an image of a designated area to check security of the designated area. The security method includes the steps of: (a) a server receiving video signals from the camera over a network established between the camera and the server and converting them to a proper image format; (b) causing the user of a portable personal communication device to operate a built-in  
15 web browser of the portable personal communication device and access the server over the mobile communication network; (c) the portable personal communication device downloading the converted video signals from the server over the mobile communication network; and (d) displaying the video signals on the portable personal communication device for the user of the  
20 portable personal communication device to check the image of the designated area.

Preferably, the security method further includes the step of (e) storing the converted video signals in the server after the step (a).

Preferably, the security method further includes the step (f) of the server's sending a text message to the portable personal communication device over the mobile communication network to inform of an emergency at the designated area, upon detection of the emergency from the video signals of the camera, after the step (a).

Preferably, the portable personal communication device gives an access to the server in step (b) after receiving the text message from the server in the step (f).

Preferably, in the step (c), the portable personal communication device downloads stored video signals generated during the emergency from the server, or real-time video signals from the camera.

Preferably, the proper image format in the step (a) is MPEG, JPEG, wavelet, or Internet streaming.

Preferably, the portable personal communication device is a PDA, a cellular phone or an IMT-2000 terminal.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention, and, together with the description, serve to explain the principles of the invention:

FIG. 1 is a schematic of a security system using a mobile communication network in accordance with an embodiment of the present invention;

FIG. 2 is a detailed view of the security system using a mobile communication network in accordance with the embodiment of the present invention;

FIG. 3 is a schematic of a personal digital assistant (PDA) connected  
5 to a cellular phone in accordance with the embodiment of the present invention;

FIG. 4 is a flow chart showing a security method using a mobile communication network in accordance with the embodiment of the present invention; and

10 FIG. 5 is a flow chart showing a security method using a mobile communication network in accordance with another embodiment of the present invention.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

In the following detailed description, only the preferred embodiment  
15 of the invention has been shown and described, simply by way of illustration of the best mode contemplated by the inventor(s) of carrying out the invention. As will be realized, the invention is capable of modification in various obvious respects, all without departing from the invention. Accordingly, the drawings and description are to be regarded as illustrative in  
20 nature, and not restrictive.

FIG. 1 is a schematic of a security system using a mobile communication network in accordance with an embodiment of the present invention.

Referring to FIG. 1, the security system using a mobile communication network according to the embodiment of the present invention includes a camera 100, a server 200, a mobile communication network 300, and a portable personal communication device 400.

5           FIG. 2 is a detailed view of the security system shown in FIG. 1.

Referring to FIG. 2, the camera 100 includes a sensor 110, a wire communication interface 120, and a wireless communication interface 130. The sensor 110 detects motion of an object at a designated area picked up by the camera 100 and, upon detection of the motion, sends an alarm signal  
10           to the exterior. The wire communication interface 120 uses a universal serial bus (USB) port or an RS-232C and the wireless communication interface 130 uses a wireless LAN. Each of the interfaces 120 and 130 establishes a communication path of video and alarm signals to the server 200,

The server 200 includes a storage unit 210 for storing the video  
15           signals picked up by the camera, an encoder 220 for converting the video signals of the camera to a different format, and a controller 230 for controlling storage and conversion of the video signals and communication over the mobile communication network. The encoder 220 encodes the video signals from the camera in a different format, such as moving picture  
20           expert group (MPEG), joint photographic expert group (JPEG), wavelet, Internet streaming, etc. so as to reduce the size of the video signals and thereby increase the transmission speed of the video signals.

The mobile communication network 300 includes an inter-working



function gateway (IWF) 310, a mobile switching center 320, a short message service center 330, a home location register 340, a base station controller 350, and a base station 360. Between the mobile communication network 300 and the server 200 is connected a TCP/IP network.

5           The portable personal communication device 400 receives the video signals and a text message over the mobile communication network 300. Examples of the portable personal communication device 400 include cellular phone, personal digital assistant (PDA), smart phone, or IMT-2000 terminal.

10           As the improved mobile communication services such as IS-95B/C are provided to enhance the transmission speed of data and facilitate transmission of large video signals, it becomes possible to provide motion picture wireless Internet services with a built-in web browser of the cellular phone so long as it is equipped with a display device of a large size.

15           The PDA is a sort of portable personal computer that allows the user to input information in his/her own handwriting and has wireless communication functions, i.e., data communication with computers and facsimile transmission in addition to the functions as an electronic diary, i.e., management of personal information and schedule. The PDA of this  
20           embodiment has a built-in web browser so that the user can give an access to the server 200 to download the stored video signals for the designated area from the server and monitor them on the PDA. The PDA can be used with an embedded RF transceiver or in serial connection to a cellular phone.

Now, a description will be given as to the portable personal communication device according to this embodiment, for example, a PDA connected to a cellular phone, with reference to the accompanying drawings.

Referring to FIG. 3, the portable personal communication device of this embodiment includes cellular phone 410 and PDA 420, which are  
5 connected to each other via a cable. The PDA 420 includes a controller 421, a display 422, a power supply 423, an A/D converter 424, a pen input sensor 425, a memory 426, a CODEC 427, and a microphone 428.

FIG. 3 is a schematic of the PDA connected to the cellular phone in  
10 accordance with the embodiment of the present invention.

The cellular phone 410 receives a text message indicating an emergency at the designated area together with video signals over the mobile communication network. The PDA 420 operates the built-in web browser to access the server over the mobile communication network and  
15 receive the video signals stored in the server via the mobile communication network and the cellular phone 410. The video signals received through the cellular phone 410 are sent to the PDA 420 via the cable, which is connected between the cellular phone and the PDA, and then transferred to the controller 421. The controller 421 decodes the video signals encoded in the  
20 Internet streaming format so that it outputs the voice component of the signals to the CODEC 427 and the video component to the LCD. The CODEC 427 is a modulator/demodulator or a coder/decoder, which is a combination of a decoder for converting the voice or audio signals to digital

ones and a coder for converting the digital signals to analog ones. Meanwhile, the video signals decoded at the controller are sent to the display 422 and displayed on the web browser of the display for the user to check security of the designated area.

5           A detailed description will now be given to an operation of the security system and a security method thereof using a mobile communication network according to the embodiment of the present invention with reference to the accompanying drawings.

FIG. 4 is a flow chart showing a security method using a mobile  
10           communication network in accordance with the embodiment of the present invention.

The camera 100 picks up an image of a designated area, in step S1.

The camera 100 sends the video signals of the designated area to the server via ~~wire communication interface~~ 120 or wireless communication  
15           interface 130, in step S2.

Upon receiving the video signals from the camera 100, the server 200 causes the encoder 230 to encode the video signals in the MPEG, JPEG, wavelet or Internet streaming format. This operation is to reduce the size of the video signals and thereby improve the transmission speed. The  
20           server 200 stores the encoded video signals in the storage unit 210, in step S3. Immediately, the server 200 can send the decoded video signals to the portable personal communication device via the mobile communication network, in step S4. Due to such an immediate transmission of the video

signals to the portable personal communication device, the user can monitor security of the designated area from data in the Internet streaming format received in real time or from video signals generated during the emergency and stored in the MPEG, JPEG or wavelet format in the server.

5           The sensor of the camera 100 detects motion of an object in the designated area and, upon detection of the motion, generates an alarm signal indicating an emergency to the exterior, in step S5. Subsequently, the camera 100 sends the alarm signal to the server 200, in step S6.

          The server 200 encodes the video signals and stores them under the  
10       control of the controller 220. The controller 220 also controls the operation of the camera 100 in regard to the direction and distance for photographing.

          Upon receiving the alarm signal from the camera 100, the controller  
220 generates a short warning text message regarding the emergency to the  
mobile communication network through the TCP/IP network, in steps S7 and  
15       S8.

          The IWF gateway 310 of the mobile communication network 300  
converts the short message received from the controller 220 of the server  
200 to a proper protocol and sends it to the short message service center  
330 via the mobile switching center 320, in step S9.

20           The short message service center 330 requests the home location register 340 for path information of the called party. The home location register 340 sends the registered path information of the called party to the short message service center 330, which in turn sends the short message on

the path reported by the home location register 340, in step S10.

The called party receives the short message through his/her portable personal communication device 400 to recognize the emergency of the designated area, in step S11.

5               Subsequently, the called party operates the built-in web browser of the portable personal communication device 400 to give an access to the server 200 over the mobile communication network 300, in step S12.

Following the access to the server 200, the portable personal communication device 400 requests a download of the stored video signals  
10               from the server 200 or real-time video signals sent from the camera 100 to the server 200, in step S13, and downloads the video signals, in step S14.

The portable personal communication device 400 decodes the video signals and displays them on the web browser of the display for the user to check security of the designated area, in step S15.

15               Now, a description will be given to a security method using a mobile communication network according to another embodiment of the present invention.

FIG. 5 is a flow chart showing the security method using a mobile communication network in accordance with another embodiment of the  
20               present invention.

The camera 100 shoots the designated area, in step S101, and sends the video signals to the server 200, in step S102.

The server 200 encodes the received video signals in the MPEG,

JPEG, wavelet, or Internet streaming format and stores the encoded video signals in the storage unit, in step S103. Alternatively, it sends the received video signals to the portable personal communication device 400 immediately, in step S104.

5           The user of the portable personal communication device 400 operates the built-in web browser to access the server 200, in step S105. After the access to the server 200 in step S106, the portable personal communication device 400 requests a download of video signals stored in the server 200, in step S107. The server 200 sends the video signals to the  
10       portable personal communication device 400, in step S108. After the access to the server 200, the portable personal communication device 400 can also download video signals stored in the server from the camera or real-time video signals in the Internet streaming format, in step S104.

          Subsequently, the portable personal communication device 400  
15       decodes the video signals and displays them on the display for the user to check security of the designated area, in step S109.

          As described above, the security system and method using a mobile communication network enables the user to check security of the designated area with the portable personal communication device.

20           It should be understood that the invention is not limited to the disclosed embodiments, but, on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims. For example, the portable personal

communication device can be not only PDA or cellular phone but also any portable communication device accessible to the server in a wireless manner.

In accordance with the present invention, the user is enabled to check security of a designated area with a portable personal communication  
5 device irrespective of place or time.

**WHAT IS CLAIMED IS:**

1. A security system using a mobile communication network,  
comprising:

a camera for picking up an image of a designated area;

5 a server connected to the camera and the network for converting the  
image received from the camera to a proper format and storing the  
converted image; and

a portable personal communication device for operating a built-in  
web browser to access the server and downloading video signals from the  
10 server to check the image of the designated area.

2. The security system as claimed in claim 1, wherein the portable  
personal communication device operates the built-in web browser to access  
the server and receives the image of the designated area in real time.

15

3. The security system as claimed in claim 1, further comprising a  
mobile communication network for allowing the portable personal  
communication device to access the server and establishing a transmission  
path of the video signals,

20 wherein upon detection of an emergency at the designated area, the  
server sends a text message over the mobile communication network to  
inform of the emergency at the designated area.



4. The security system as claimed in claim 3, wherein upon detection of the emergency at the designated area from the received text message, the portable personal communication device gives an access to the server to download the stored video signals generated during the emergency from the server and check security of the designated area.

5. The security system as claimed in claim 1, wherein the server converts the image received from the camera in a format including moving picture expert group (MPEG), joint photographic expert group (JPEG), wavelet, or Internet streaming.

6. The security system as claimed in claim 1, wherein the portable personal communication device is a personal digital assistant (PDA), a cellular phone, or an IMT-2000 terminal.

15

7. A security method using a mobile communication network, in which a camera picks up an image of a designated area to check security of the designated area, the method comprising the steps of:

(a) a server receiving video signals from the camera over a network established between the camera and the server and converting them to a proper image format;

(b) causing a user of a portable personal communication device to operate a built-in web browser of the portable personal communication

device and access the server over the mobile communication network;

(c) the portable personal communication device downloading the converted video signals from the server over the mobile communication network; and

5 (d) displaying the video signals on the portable personal communication device for the user of the portable personal communication device to check the image of the designated area.

8. The security method as claimed in claim 7, further comprising the  
10 step of (e) storing the converted video signals in the server after the step (a).

9. The security method as claimed in claim 7, further comprising the step (f) of the server sending a text message to the portable personal communication device over the mobile communication network to inform of  
15 an emergency at the designated area, upon detection of the emergency from the video signals of the camera, after the step (a).

10. The security method as claimed in claim 9, wherein the portable personal communication device gives an access to the server in step (b)  
20 after receiving the text message from the server in the step (f).

11. The security method as claimed in claim 10, wherein in the step (c), the portable personal communication device downloads stored video

signals generated during the emergency from the server, or real-time video signals from the camera.

12. The security method as claimed in claim 7, wherein the proper  
5 image format in the step (a) is MPEG, JPEG, wavelet, or Internet streaming.

13. The security method as claimed in claim 7, wherein the step (d) includes the step (g) of decoding the video signals converted to the proper image format.

10

14. The security method as claimed in claim 7, wherein the portable personal communication device is a PDA, a cellular phone or an IMT-2000 terminal.

FIG. 1

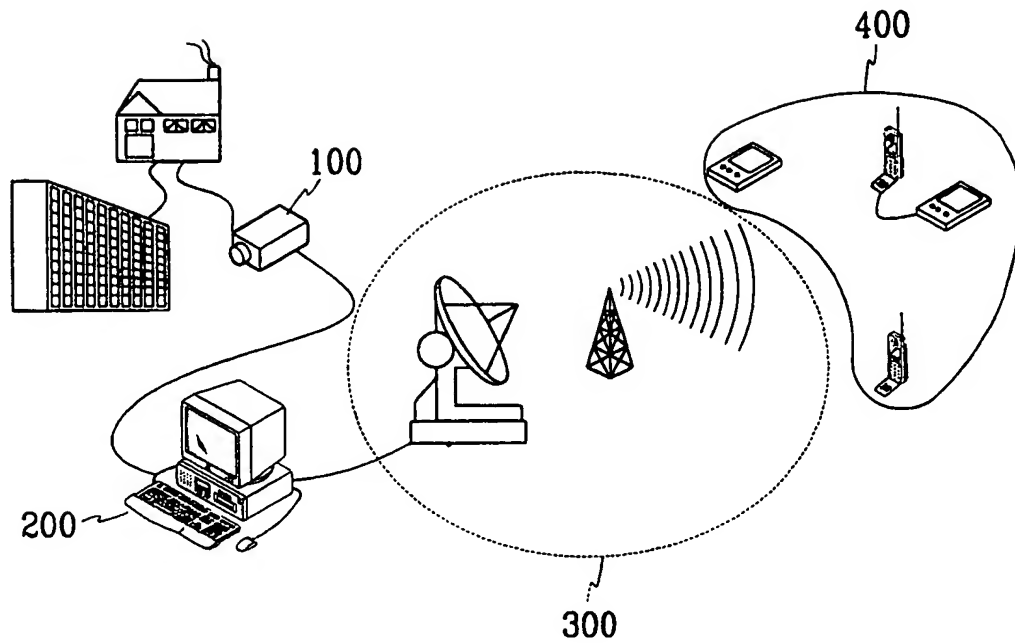


FIG. 2

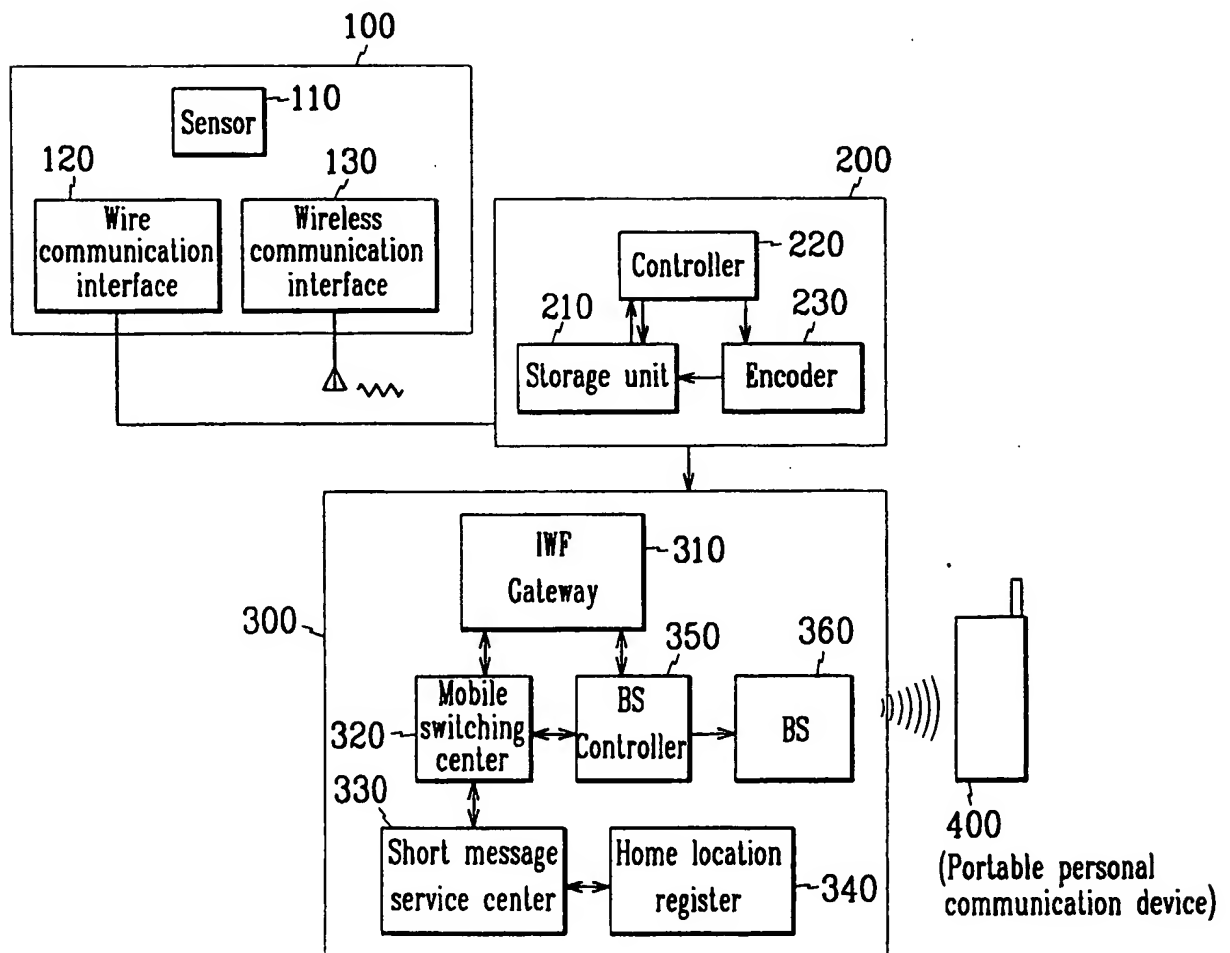


FIG. 3

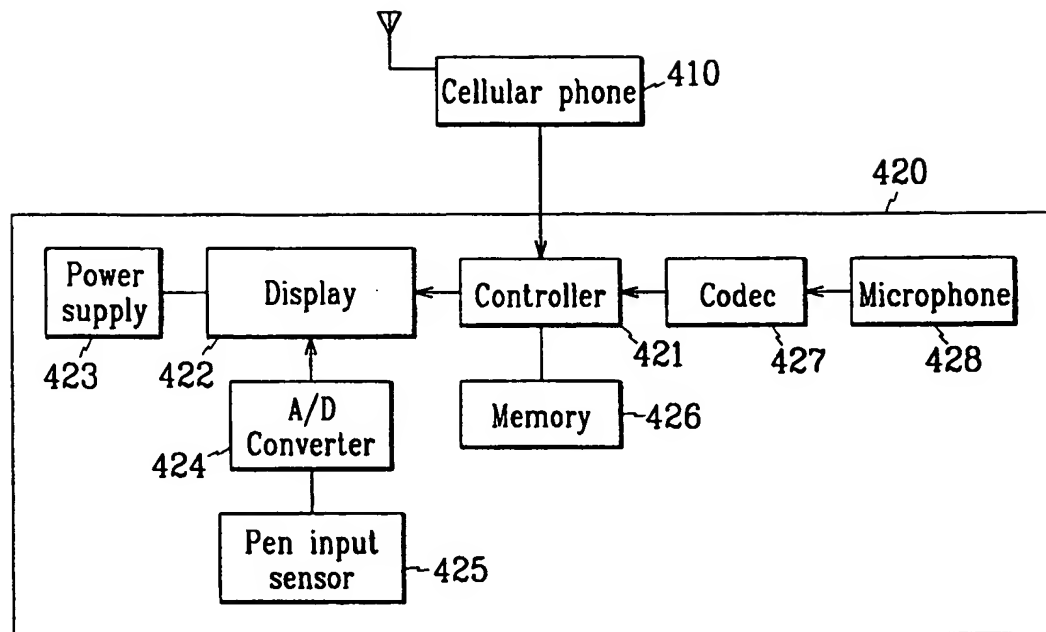


FIG. 4

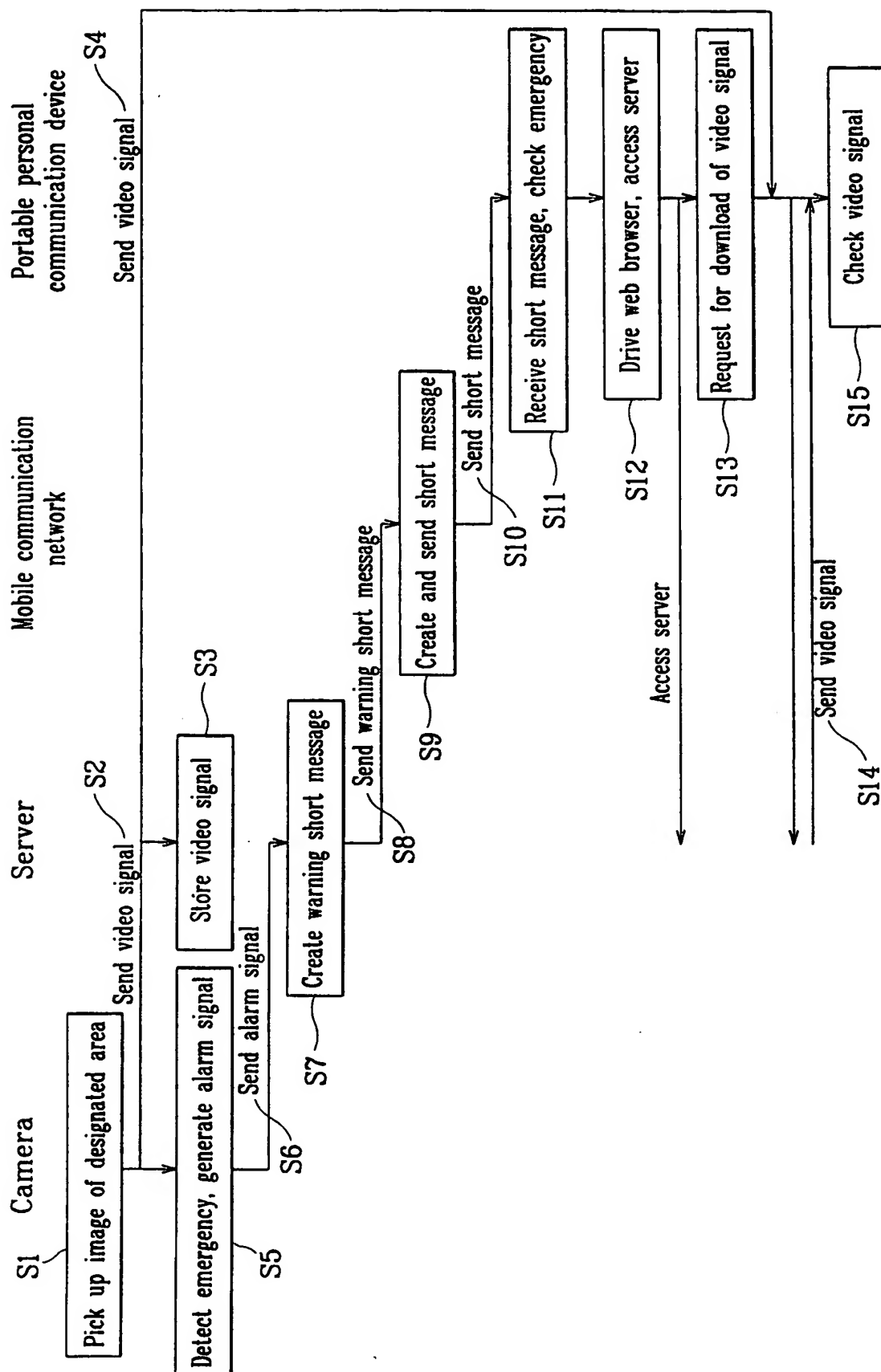
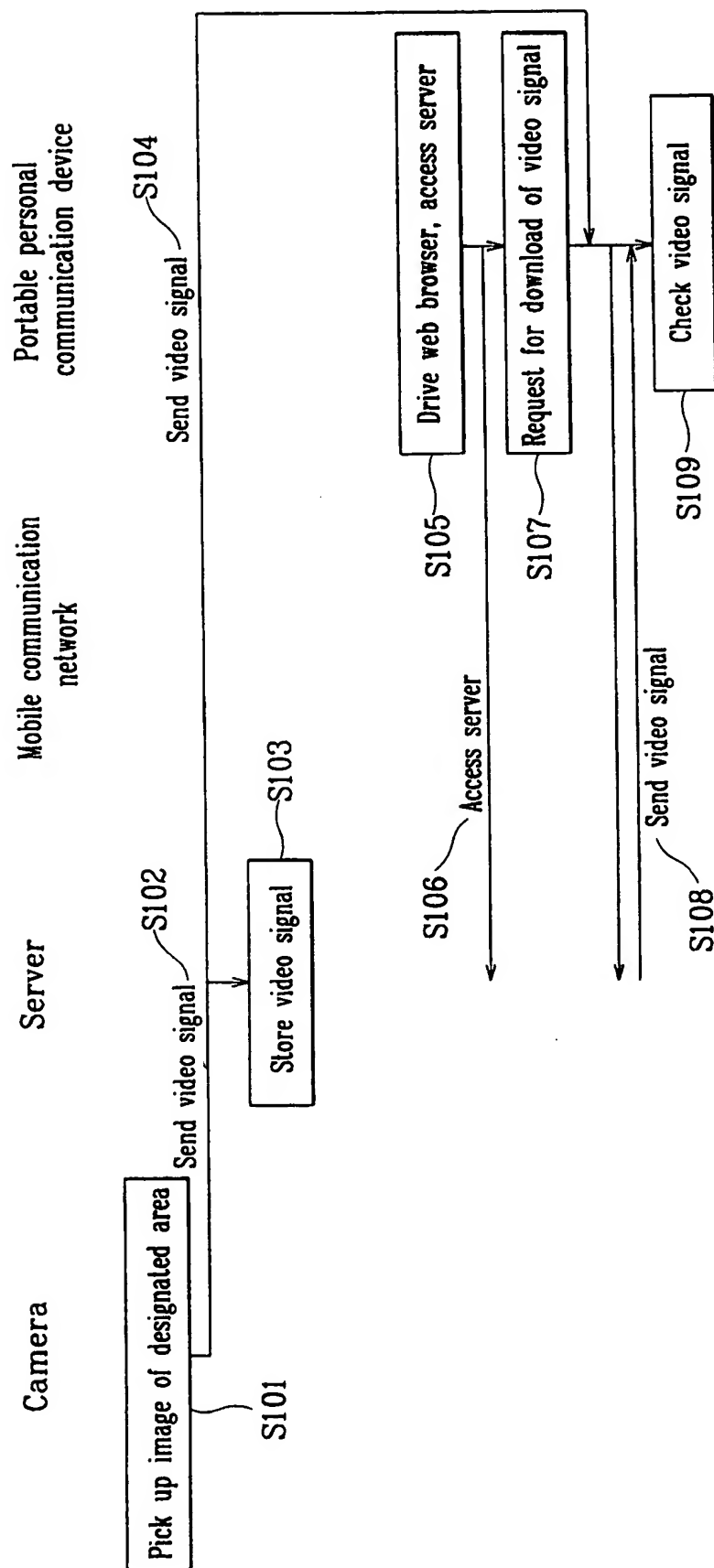


FIG. 5



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR00/01059

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 H04L 9/32**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H04L 9/32, 9/00 H04J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KOREAN PATENTS AND APPLICATIONS FOR INVENTIONS SINCE 1983

JAPANESE PATENTS AND APPLICATIONS FOR INVENTIONS

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 08-96280 A (TANAKA) 12 APRIL 1996(12.04.1996) ABSTRACT, FIG1	1, 7
A	KR 94-9501B(KIM JIN OH) 14.OCTOBER.1994(14.10.1994) FIG1,FIG2	1, 7
P.Y	KR 99-78861 A(BUM A SECURITY INC.)05 NOVEMBER 1999(05.11.1999) ABSTRACT, FIG2	1, 7
A	KR 98-80563 A(TOSHIBA) 25.NOVEMBER 1998(25.11.1998) ABSTRACT	1, 7

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
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- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

29 DECEMBER 2000 (29.12.2000)

Date of mailing of the international search report

30 DECEMBER 2000 (30.12.2000)

Name and mailing address of the ISA/KR

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Government Complex-Taejon, Dunsan-dong, So-ku, Taejon  
Metropolitan City 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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Telephone No. 82-42-481-5667





**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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KR94-9501 B	14.10.1994	NONE	
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